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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

A Mouldable Flocked Material and a Method of making same

We, T. F. FIRTH & SONS LIMITED, a British Company of Flush Mills, Heckmondwike, Yorkshire, whose Registered Office is situated at Clifton Mills, Brighouse, Yorkshire, do hereby declare the invention for which we pray that a Patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement: —

This invention relates to mouldable sheet-like materials and articles made therefrom, and has for its object the provision of such materials which, during moulding can stretch in all directions in their own plane, thereby rendering them ideally suited for moulding to desired regular or irregular shapes, e.g. by vacuum forming or other moulding processes.

Products resulting from the use of flocked materials made in accordance with this invention may be utilised for a large number of diffent purposes, one particular purpose being for moulded floor covering for motor vehicles, in which the covering may have to assume an irregular shape to fit over a gear box housing and a housing for the main propellor shaft. A further particular purpose for which the material can be used is for moulded upholstery for furniture.

According to the present invention, there is provided a mouldable flocked sheet-like material which comprises a layer of stretchable fabric which has been bonded to a layer of flexible thermoplastic material when the latter was in a liquid or tacky state, the layer of stretchable fabric or the layer of thermoplastic material having flock adhered thereto by a coating of adhesive applied to to the stretchable fabric or to said flexible thermoplastic material.

To enable the invention to be clearly understood, embodiments thereof will now be described by way of example with reference to the accompanying purely diagrammatic drawings, wherein: —

Fig. 1 illustrates one embodiment of the mouldable flocked material.

Figure 2 illustrates a method of making the material illustrated by Figure 1, and

Figure 3 illustrates a second embodiment of the mouldable flocked material.

Referring firstly to Figure 1 of the drawings, one method of producing a flocked material according to this invention consists in applying a flexible thermoplastic material 1 e.g. P.V.C. to a release material 2, applying a knitted fabric or other stretchable fabric 3 to the thermoplastic material 1 whilst in a liquid or tacky state, drying, and removing said release material 2, applyig a coating of adhesive 4 to the exposed surface of the stretchable fabric 3 and then applying flock 5 to the adhesive surface of the said fabric 3.

This method results in a mouldable flocked material having an exposed base layer of thermoplastic material 1 such as P.V.C. and an upper or outer layer of flock 5 with a connnected stretchable fabric 3 sadwiched therebetween.

The release material 2 has been shown in Figure 1 to facilitate description and does not constitute a part of the flocked material per se, this release material being removed during manufacture of the flocked material as hereinafter explained with reference to Figure 2.

One convenient way of carrying into effect the foregoing method is, as shown in Figure 2, to feed a web of release material 2 beneath a curtain 1a of P.V.C. 1 in liquid state, and to feed against the liquid P.V.C. a web of stretchable fabric 3.

The laminate comprising the release material 2, the thermoplastic material 1 and the stretch-

able fabric 3 is then passed between a pair of pressure and guide rollers 6, which serve to consolidate the laminate. The latter then passes under a drier 7 and the release material 2 is automatically removed so as to expose the thermoplastic material 1.

The exposed surface of the stretchable fabric 3 is then coated with a thermoplastic or thermosetting paste or adhesive 4, and flock 5 is then applied to this paste or adhesive surface of the stretchable fabric 3 in any known manner, e.g. by electro-deposition or in any other suitable manner. The complete laminate comprising the base layer of thermoplastic material 1 and the intermediate layer of stretchable fabric 3 with the flock 5 thereon is then suitably fused or cured.

The finished laminate, which of course is flexible, can be formed into a roll until it is required to be used.

A convenient way of producing the second embodiment of the invention illustrated by Figure 3 is to coat a release material with liquid P.V.C. 1 and to laminate the stretchable fabric 3 to the exposed face of the P.V.C. whilst the latter is still liquid or tacky. This laminate is then dried and the release material separated therefrom, and a coating of adhesive 4 is applied to the exposed face 1b of the P.V.C. (i.e. not the face to which the stretchable fabric 3 is bonded) and block 5 is applied to the adhesive on the P.V.C. 1, and the resulting laminate is then cured.

Thus with the embodiment of Figure 3, the whole of the thermoplastic material 1 and adhesive 4 is located on one side of the fabric 3 and between the latter and the flock 5.

The finished flocked material of both embodiments can be subsequently moulded into any desired shape to provide a required article e.g. by vacuum forming or by any other moulding process.

The invention also includes articles, for example, car floor coverings, and furniture upholstery, resulting from the formation into required shapes of the flocked material made as herein described and claimed.

The expression "stretchable fabric" used herein is intended to include (a) knitted fabric, (b) those woven fabrics which have a stretch characteristic by weave or yarn construction.

WHAT WE CLAIM IS:—

1. Mouldable flocked sheet-like material comprising a layer of stretchable fabric, which has been bonded to a layer of flexible thermoplastic material when the latter was in a liquid or tacky state, the layer of stretchable fabric or the layer of thermoplastic material having flock adhered thereto by a coating of adhesive applied to the stretchable fabric or to said flexible thermoplastic material.

2. A method of making a mouldable material as claimed in Claim 1 and in which the flock is adhered to the stretchable fabric, which consists in applying a thermoplastic material to a release material to form a layer, applying a stretchable fabric to the layer of thermoplastic material whilst the latter is in a liquid or tacky state, drying said layer of thermoplastic material and removing said release material, appyling a coating of adhesive to the exposed surface of the stretchable fabric and then applying flock to the adhesive-coated surface of the said fabric.

3. A method as claimed in Claim 2, which consists in feeding a web of said release material beneath a curtain of said thermoplastic material in liquid state to form a layer of said thermoplastic material on the release material, feeding said stretchable fabric against said liquid thermoplastic layer, passing the resulting laminate comprising the release material, thermoplastic material and the stretchable fabric between a pair of pressure and guide rollers, to consolidate the laminate, passing the latter beneath a drier and removing the release material, coating the exposed surface of the stretchable fabric with a thermoplastic or thermosetting adhesive, applying flock to this adhesive-coated surface of the fabric in any known manner, and then curing the resulting complete laminate.

4. A method of making a mouldable flocked material as claimed in Claim 1, and in which the flock is adhered to the flexible thermoplastic material, which consists in a coating a release material with thermoplastic material in liquid form, laminating a stretchable fabric to the exposed surface of the thermoplastic material while the latter is still liquid, drying the laminate and removing said release material, applying a coating of adhesive to the exposed face of the thermoplastic material (i.e. the face not having the stretchable fabric applied thereto), applying flock to the adhesive-coated surface of the thermoplastic material and curing the resulting laminate.

5. Mouldable flocked material constructed substantially as hereinbefore described, with reference to and as illustrated by Figures 1 and 3 of the accompanying drawings.

6. The methods of making a mouldable flocked material as claimed in Claim 1 or 5, substantially as hereinbefore described with reference to and as illustrated by the accompanying drawings.

7. Car floor covering, or furniture upholstery or other articles moulded from flocked material as claimed in Claim 1 or 5.

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1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

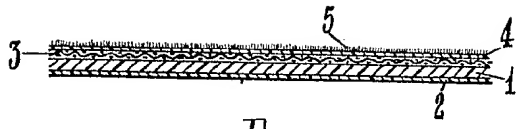

Fig 1.

Fig 3.

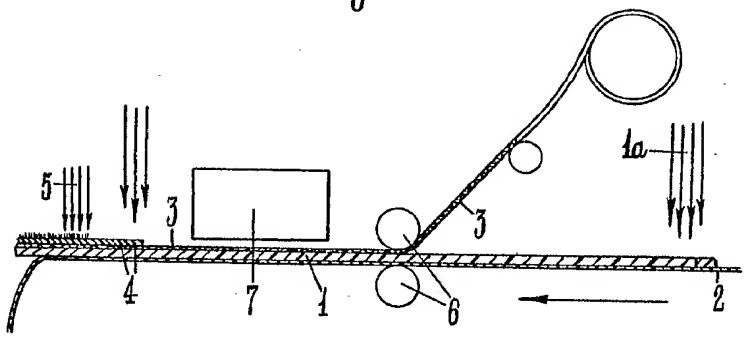

Fig 2.